SUPREME

Testing Instruments

MODEL

562

AUDOLYZER

INSTRUCTION MANUAL

SUPREME INSTRUMENTS CORPORATION

GREENWOOD, MISSISSIPPI

U. S. A.

SUPREME MODEL 562

ELECTRICAL SPECIFICATIONS

POWER SUPPLY REQUIREMENTS: (unless otherwise specified on plate attached to instrument.)

Voltage.....110/125 volts A-C
Frequency.....50/60 cycles
Power Consumption.....50 watts maximum

MECHANICAL SPECIFICATIONS

OVER-ALL DIMENSIONS:

Height.....11-1/2 inches
Width.....15-1/2 inches
Depth..... 8-3/4 inches

WEIGHTS:

Net.....28 pounds
Shipping.....33 pounds

STANDARD EQUIPMENT SUPPLIED WITH THE SUPREME MODEL 562

QUANTITY INCLUDED	STOCK NUMBER	DESCRIPTION	PACKER'S CHECK
1	5294	Booklet, Operating Data	
1	6725	Card, Return Registration	
1	5298	Test Lead, Shielded Audio	
1	5297	Test Lead, Shielded R-F	

The above list has been checked by the undersigned who is responsible for the completion of this package

MODEL 562 *(Signed)* .....
Shipping Department

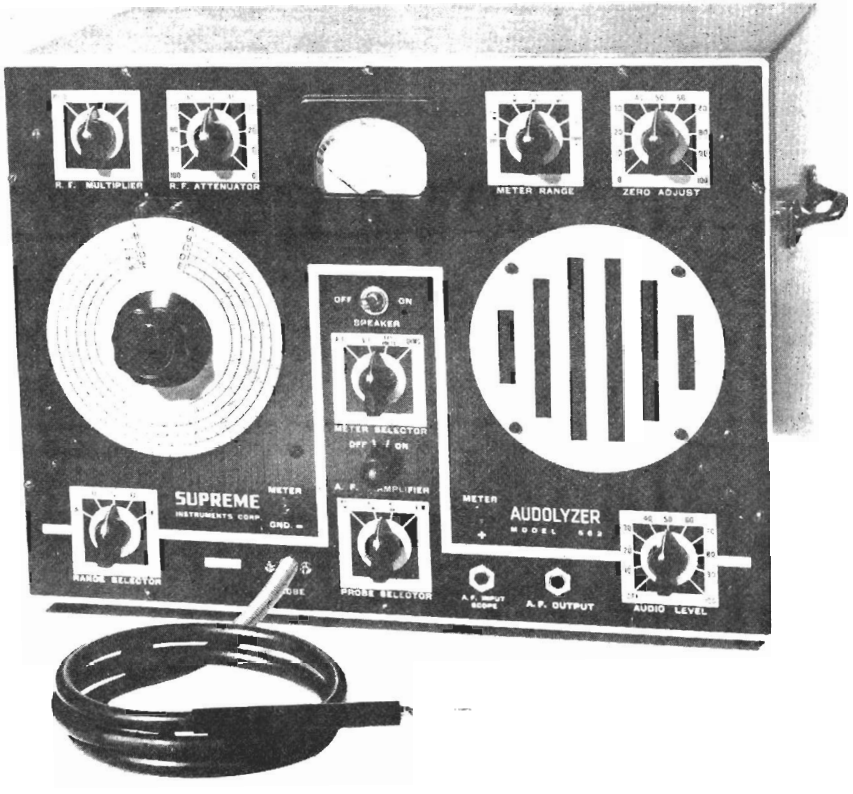
SERIAL #.....

MENTION ABOVE NUMBERS IN ALL CORRESPONDENCE.

IMPORTANT

See enclosed colored page for information concerning Registration, Transportation Damages, Warranty, Replacement Parts, etc.

The instructions listed on this colored sheet *must* be complied with before the warranty policy is applicable. The Model and Serial numbers should be mentioned in *all* correspondence regarding this tester.


R. F. MULTIPLIER
R.F. ATTENUATOR
METER RANGE
ZERO ADJUST
OFF ON
SPEAKER
METER SELECTOR
OFF 1 2 ON
SUPREME
INSTRUMENTS CORP.
METER
GND.
AUDOLYZER
MODEL 662
METER
RANGE SELECTOR
PROBE SELECTOR
A.F. INPUT
SCOPE
A.F. OUTPUT
AUDIO LEVEL

#5294
INSTRUCTION MANUAL
FOR
SUPREME MODEL 562 AUDOLYZER
("A" SERIES)

GENERAL DESCRIPTION

The SUPREME Model 562 Audolyzer is a complete dynamic analyzer for checking radio receivers and associated electronic apparatus under actual operating conditions. It incorporates a signal tracer, audio reproducer, vacuum-tube voltmeter, ohmmeter and output indicator. The Audolyzer may be used wherever it is necessary to check the relative amplitudes of the voltages and condition of the signal in practically all types of radio receivers.

Essentially, the Audolyzer is a high-quality radio receiver with provisions whereby the operator may eliminate any stage or section under suspicion. All functions for the general procedure used in servicing radio receivers are accessible through a single probe and a multi-function selector switch.

The most important feature of the instrument is that it is a signal monitor. Provisions are made for checking any type signal - R-F, I-F, A-F or the local oscillator. The radio frequency amplifier is composed of one untuned and two tuned R-F stages which terminate at a diode detector circuit. This amplifier covers a range from 95 kc. to 14.5 mc. in five overlapping bands. The audio amplifier uses two stages of amplification to provide aural indication on a high-quality, five-inch dynamic speaker.

The vacuum-tube voltmeter is of the single-tube bridge type which provides maximum stability of calibration. This function covers a wide

range and will measure potentials from 0.1 volts to 1000 volts D-C. A particular feature of this section is the center scale dial calibration which gives both forward or backward indication to permit readings to be made without reversing the probes.

The ohmmeter is of the convential ring type which has been used on SUPREME instruments for almost a decade. Resistance may be measured from 0.1 ohm to 20 megohms in five carefully selected ranges. This function is particularly useful in making tests of shorts and open circuits, continuity, etc.

Power Supply Requirements

Unless otherwise specified, the instrument is designed to operate from 110 to 125 volts at 50/60 cycles. Power consumption is 50 watts. The rectifier tube in some instruments is a 6X5GT and in others, a type 80.

Panel Markings and Components

METER:

Three-inch, square d'Arsonval type.
Scales:
D-C VOLTS - Center scale '0' for reading D-C potentials.
OHMS - 0 to 2,000, non-linear for reading resistance, continuity, etc.

ROTARY SWITCH:

(Upper extreme left hand corner - labeled R-F MULTIPLIER) Four positions for controlling input of signal in decade multiples of '1, 10, 100, and 1000'

ROTARY POTENTIOMETER:

(Left hand side of panel - labeled R-F ATTENUATOR) R-F input control used as fine adjustment in conjunction with R-F MULTIPLIER.

ROTARY SWITCH:

(Upper rignt hand side of panel - labeled

METER RANGE) For selection of ranges on volts and ohms function.

ROTARY POTENTIOMETER:

(Upper right hand side of panel - labeled ZERO ADJUST) For preliminary adjustments on the D-C volts and ohmmeter functions.
NOTE: Leads *must* be shorted together when adjusting Voltmeter to '0'.

ROTARY SWITCH:

(Lower left hand side of panel - labeled RANGE SELECTOR) For selecting band of R-F amplifier.

ROTARY SWITCH:

(Lower center of panel - labeled METER SELECTOR) For selection of functions 'R-F' output, 'A-F' output, 'EXT. VOLTS' and 'OHMS'.

ROTARY SWITCH:

(Lower center of panel - labeled PROBE SELECTOR) For automatic connection of probes to input of desired channel.

TOGGLE SWITCH:

(Upper center of panel - labeled SPEAKER) For eliminating or adding the aural indicator (speaker).

ROTARY SWITCH:

(Center of panel - labeled A-F AMPLIFIER) For eliminating or adding A-F amplifier.

DIAL:

(Left hand side of panel) Radio frequency selector for tuning in R-F, I-F, or oscillator signal.

SPEAKER:

(Right hand side of panel behind grill) For aural indication of hum distortion, etc.

PIN JACKS:

(Lower center of panel - labeled METER GND. - and METER +) External probe connections to D-C voltmeter and ohmmeter.

PROBE JACK:

(Lower right hand side of panel - labeled A-F INPUT SCOPE) Input terminal for testing audio frequency devices and output for cathode ray oscilloscope.

PROBE JACK:

(Lower right hand side of panel - labeled A-F OUTPUT) Output terminal for audio amplifier of the Audolyzer for testing speakers.

ROTARY POTENTIOMETER:

(Lower right hand side of panel - labeled AUDIO LEVEL) Power 'off-on' switch and level control for audio amplifier.

CABLE:

(Insulated and braided metallic connector on rear of instrument) R-F input for using the Audolyzer as a receiver.

MODEL NUMBER:

(Lower right hand side of panel - AUDOLYZER Model 562).

SERIAL NUMBER:

(Lower left hand side of panel - printed on panel.)

OPERATION

Connect power supply cable to a convenient A-C supply socket after you have made certain that it is the proper voltage and frequency.

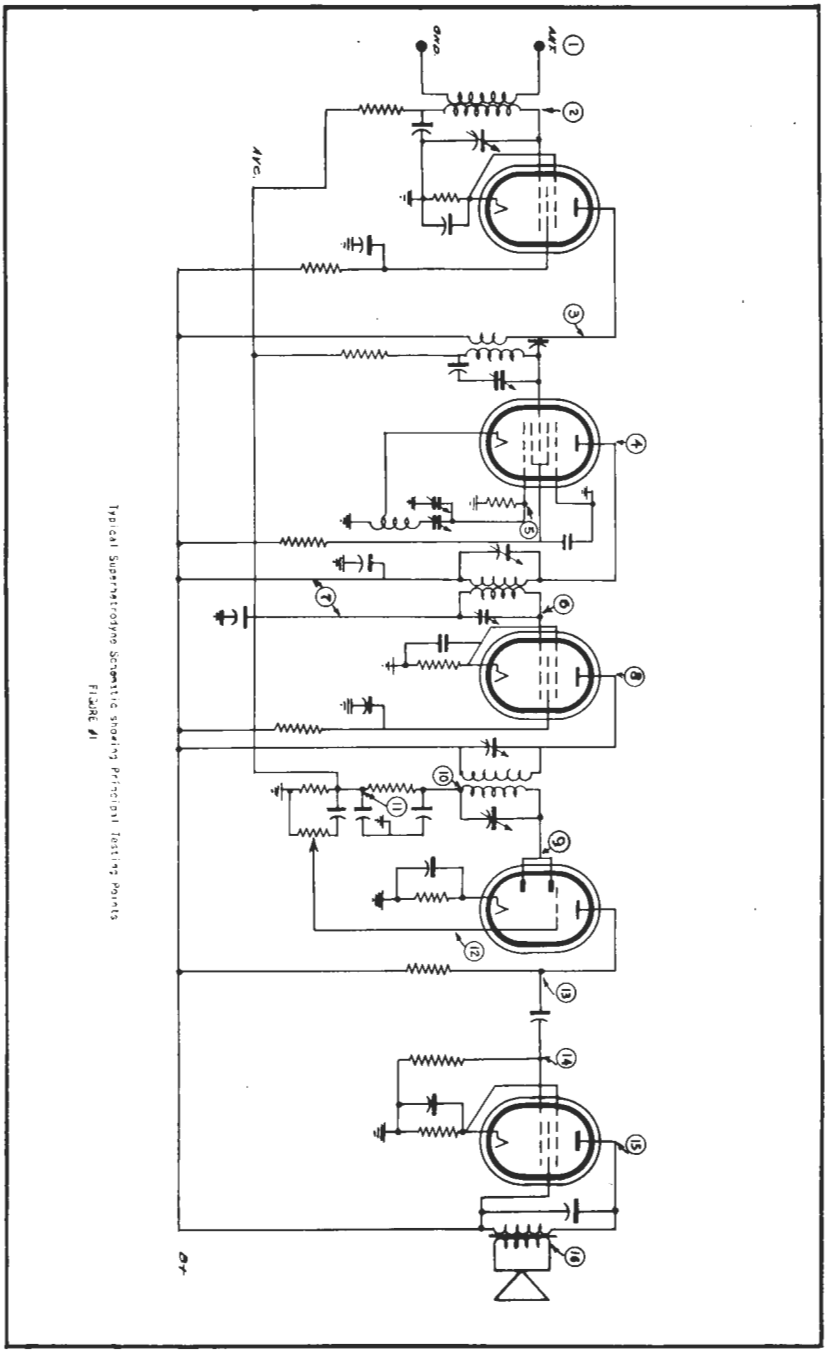
Set all controls in an extreme counter-clockwise position. Advance the AUDIO LEVEL control to approximately 60. The movement of the meter pointer indicates that the instrument power is on. It should be allowed to heat for approximately five minutes before the preliminary adjustments are made.

With any good oscillator, feed a modulated R-F signal into the antenna of the receiver at approximately 1000 kc. and tune the receiver to

the correct dial frequency. Set the PROBE SELECTOR to the 'R.F. IN position. Set the RANGE SELECTOR to the correct band - in this case, it would be band 'C'. Turn the R.F. MULTIPLIER to position '1' and turn the R.F. ATTENUATOR to '0' position. With the SPEAKER switch set at 'ON' position, place the test probe on the antenna of the receiver and tune in the signal with the tuning dial.

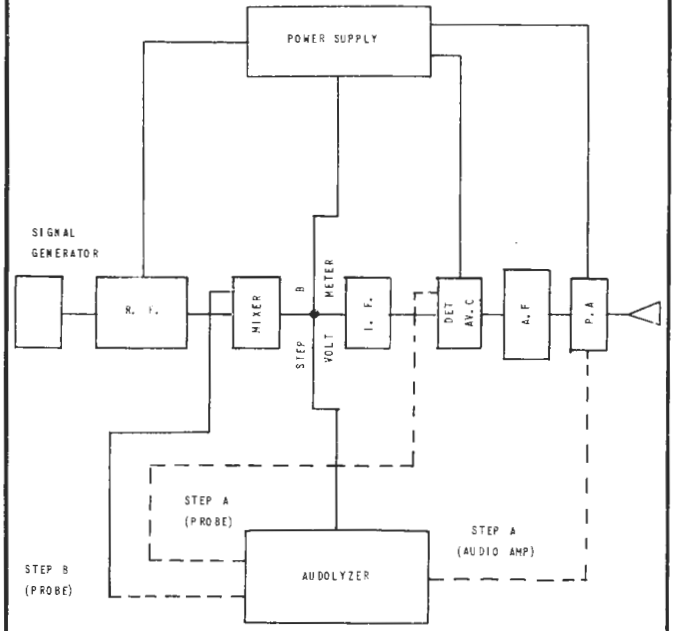
TO CHECK SIGNAL THROUGH THE ANTENNA TRANSFORMER: Referring to the diagram, Figure 1, move the test probe from (1) the antenna post to (2) the control grid of the R-F tube. This is also the stator of the R-F section of the tuning condenser gang. There is normally a gain in the antenna coil; and therefore, we should check the transformer for such gain. To make this check proceed as listed in following paragrapn.

TO CHECK GAIN IN ANY STAGE: To make gain measurement, the R.F. MULTIPLIER and R.F. ATTENUATOR controls are used in conjunction with the meter. To avoid distortion due to overload, these controls should be set so that the most sensitive possible voltmeter range can be used. The R.F. MULTIPLIER should be set so that the voltmeter range is not over 30 volts. Then the input signal will not overload the first tube. As an example, suppose it is desired to check the gain through the antenna transformer. With the METER SELECTOR set in the 'R.F.' position, first place the probe on the antenna post. Set the R.F. MULTIPLIER and R.F. ATTENUATOR so that the RANGE SELECTOR can be set at '1' or '3'. Assume that it was set at '1' and read 0.5 volts, then move the probe to (2) or the grid of the R-F tube, and suppose that the meter indicates 1.5 on the 3-volt range. Then the gain is 1.5 divided by 0.5 or 3.0. If there is not a gain but a loss, then the reading taken at (2) will be lower than that taken at (1). In such cases, signal tracing should be carried no further until this condition is remedied, unless instructions with the receiver list this as normal. Loss of gain may be



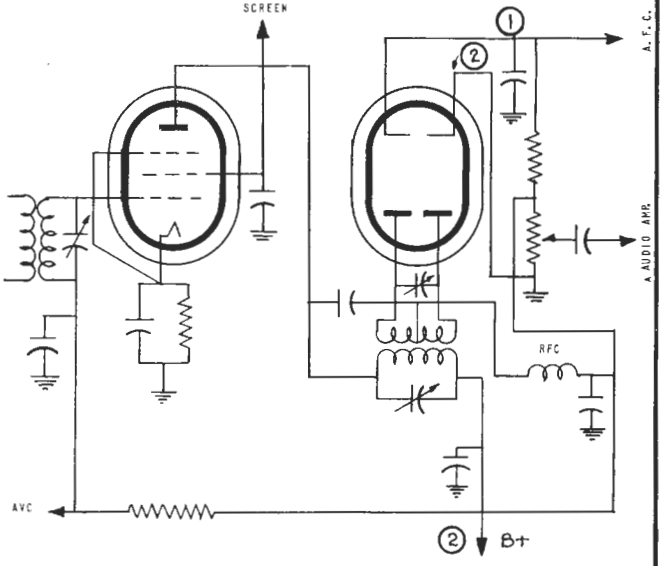
Typical Superheterodyne Schematic showing Principal Testing Points

FIGURE #1



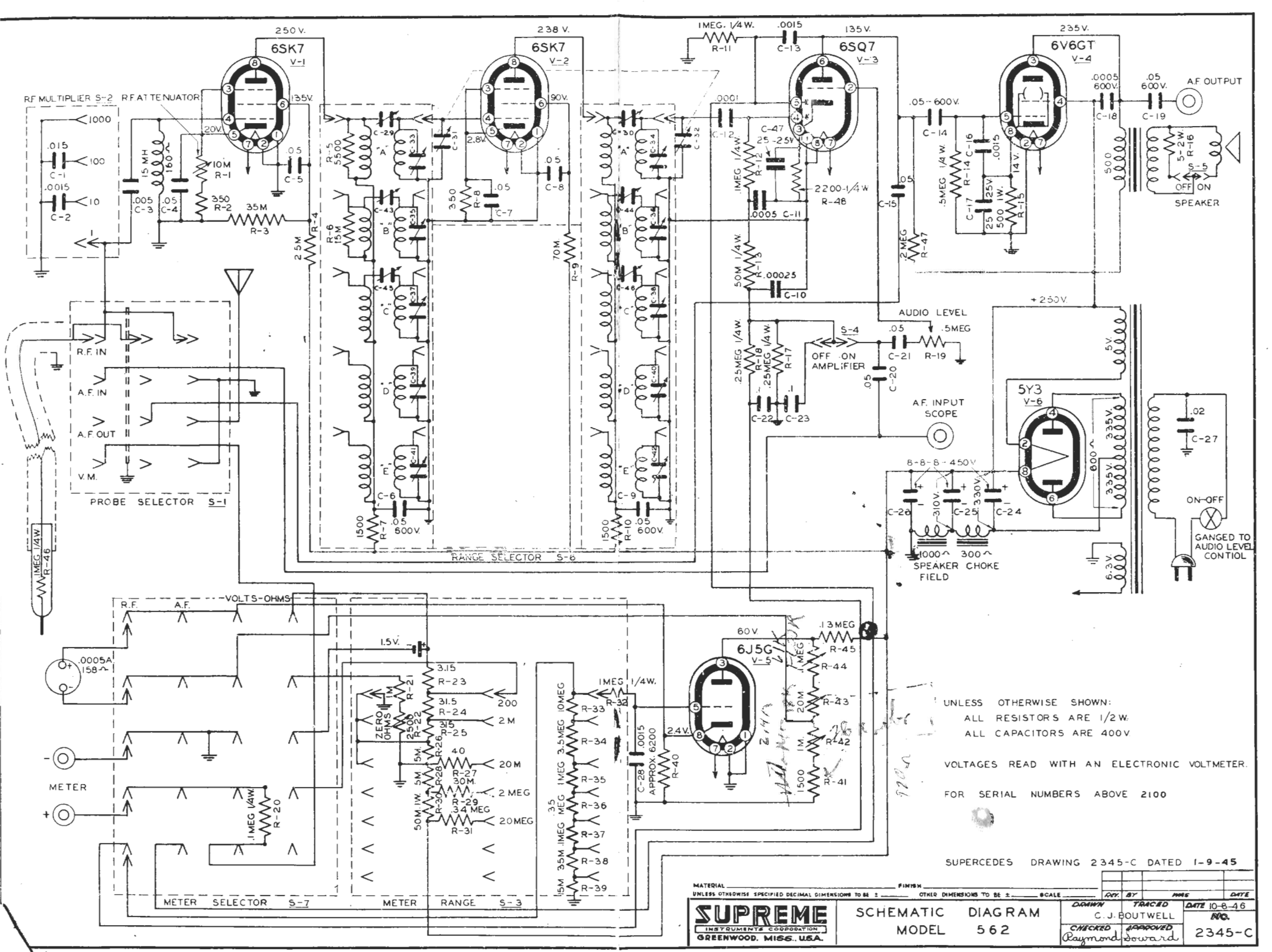
Connections for Checking Intermittents

FIGURE #2



Typical Frequency Discriminator circuits For Automatic Frequency Control.

FIGURE #3


6SK7 V-1
6SK7 V-2
6SQ7 V-3
6V6GT V-4
6J5G V-5
5Y3 V-6
250 V.
238 V.
135V.
235V.
90V.
60V.
+250V.
RF MULTIPLIER S-2
RF ATTENUATOR
R.F. IN
A.F. IN
A.F. OUT
V.M.
PROBE SELECTOR S-1
RANGE SELECTOR S-6
VOLTS-OHMS
R.F.
A.F.
METER
METER SELECTOR S-7
METER RANGE S-3
AUDIO LEVEL
OFF ON
AMPLIFIER
A.F. INPUT SCOPE
A.F. OUTPUT
SPEAKER
OFF ON
ON-OFF
GANGED TO AUDIO LEVEL CONTIOL
SPEAKER FIELD
CHOKE
8-8-8-450V
1.5V.
2.4V.
ZERO OHMS
APPROX. 6200
UNLESS OTHERWISE SHOWN:
ALL RESISTORS ARE 1/2 W.
ALL CAPACITORS ARE 400V.
VOLTAGES READ WITH AN ELECTRONIC VOLTMETER.
FOR SERIAL NUMBERS ABOVE 2100
SUPERCEDES DRAWING 2345-C DATED 1-9-45
SUPREME INSTRUMENTS CORPORATION GREENWOOD, MISS., U.S.A.
SCHEMATIC DIAGRAM
MODEL 562
DRAWN C. J. BOUTWELL
TRACED
DATE 10-8-46
CHECKED Raymond
APPROVED Howard
NO. 2345-C

caused by shorted primary or secondary turns, leaking blocking capacitors, or capacitor frame not being grounded.

With the signal being amplified in the antenna transformer, the next step is to (3), the plate of the R-F tube.

TO CHECK SIGNAL PRESENCE AND GAIN IN THE R.F.STAGE: Place probe on point (3). The Audolyzer need not be retuned as we are working with the same frequency as that in the antenna transformer. If the signal is present at point (3), the signal will be heard in the speaker of the Audolyzer. Check the gain the same way it was checked in the antenna transformer. In case there is a loss of signal, it must be due to the fact that the tube is not performing properly. In checking the operating voltage we can use the electronic voltmeter. It is not necessary to change probe - simply set the PROBE SELECTOR to 'V.M.' and the METER SELECTOR TO 'EXT'. Then all the D-C voltages can be checked, including the bias of the R-F tube, while the signal is still going through the tube. The amount of gain normally found in different stages is not mentioned here as they are listed separately under 'AVERAGE GAIN PER STAGE VALUES'. If we assume that the normal signal is at point (3), we are ready to continue through the set.

TO CHECK SIGNAL AT MIXER TUBE: At the mixer tube plate, three signals will be present.

All these signals are of different frequencies and all are important. They are the I-F, the R-F, and the signal produced by the local oscillator. With the probe at (4), test for the R-F signal with the Audolyzer set the same as when checking for the R-F signal at the R-F stage. There will be a loss of R-F signal from the points (3) and (4), but there must be an R-F signal at (4) before the I-F signal can be produced. If the R-F signal is present at point (4), then the I-F frequency may be checked. Set the band selector to the proper band - band 'B' if the I-F is 456 kc. Tune in the I-F

signal and note its frequency on the Audolyzer dial.

If the receiver's dial is still at 1000 kc. and we read the proper I-F frequency, then we know that the oscillator is correctly tuned. If the I-F frequency is wrong and the R-F frequency is correct, then we know that the oscillator is incorrectly tuned. This does not mean, however, that the amplitude of the oscillator is correct, so test the output in the following manner. Place the probe on point (5) which is the stator of the oscillator section of the tuning condenser. Set the band selector to the proper range, which in this case, would be band 'C'. Check to see that the receiver dial is still at 1000 kc. If it is, the oscillator frequency should be equal to the dial setting plus the intermediate frequency. In this case, it would be 1000 kc. plus 456 kc. or 1456 kc. On a very few receivers it will be found that oscillator frequency is lower than the R-F frequency on some of the bands. This signal will not be heard in the speaker since it is unmodulated; accordingly, the meter must be used to tune in the signal. The amplitude of the signal can be read on the meter and compared to the reading obtained on another set of the same make which is known to be working correctly.

In the mixer tube we have checked the local oscillator frequency and output, the presence of the R-F signal and its frequency, the presence of the I-F signal and its frequency.

Let us suppose we do not find the I-F signal at (4) by tuning in the vicinity of 456 kc. We 'hunt' for it by tuning the dial over a range of frequencies and find it 25 or 50 kc. away. Then we know that the oscillator is working at the wrong frequency, possibly because of a defective padder, trimmer, or coil. If there is no I-F frequency at (4), then the oscillator is dead or the R-F signal is not present at (4). Check the oscill-

ator at (5) and then check to see that the signal reaches point (6).

TO CHECK I-F TRANSFORMERS: With the correct I-F frequency established at (4), next check at point (6). Reset the Audolyzer for the correct I-F frequency and move the probe from (4) to (6). If the signal does not reach point (6) the trouble is in the I-F transformer. The presence of the signal at (4) eliminates the primary of the transformer; therefore, the absence of the signal at (6) must be due to a defective secondary, misalignment of primary or secondary, or defective trimmers.

Assuming that the correct signal is at point (6), we now check at (8), the plate of the I-F tube. Here the signal is still of the I-F frequency but has a greater amplitude, since it has been amplified by the I-F tube. If the signal is not present at (8), the same system can be used to find the defective part as that described for the R-F tube. Check points (7) for *no* signal. If signal is present here look for an open bypass capacitor.

With the correct signal at point (8) we then check (9) or the diode plates. Here the signal is of a lower level than at (8) because of the loading effect of the diode plates. Average values of this loss may vary from about 1.25 to 1 to 3 to 1.

We do not recommend the checking of the total gain of the R-F and I-F sections of a receiver in one operation, that is, from antenna post to diode plates. The frequency of the two signals varies and it is impractical to try to manufacture tuned R-F amplifiers over a number of bands and hold the gain constant. Accordingly, we recommend the checking of each individual stage where the frequency remains constant.

TO CHECK A.V.C. In this particular diagram the R-F signal from which the A.V.C. voltage is developed is the same as that which feeds the diode detector. In some instances, separate plates of the diode are

used for detection and A.V.C. In such cases, the R-F signal should be present on both diode plates.

RECEIVERS WITH A.F.C. Such receivers do not complicate signal tracing, as there is usually an 'ON-OFF' switch for the A.F.C. circuits. With the A.F.C. switch in the 'OFF' position, normal procedure can be followed. A few extra steps are necessary to test the A.F.C. The exact alignment procedure of such circuits is described under 'ALIGNMENT'.

TO CHECK AUDIO CIRCUITS: Since we have traced the R-F signal to the plates of the diode detector, we are now ready to continue with the audio circuits. Set the PROBE SELECTOR SWITCH to 'A.F. IN' position and turn the AUDIO LEVEL to '100' which gives full sensitivity. The audio signal should appear at (10) and (11). If the signal is found at (11), move to (12). This checks all coupling and by-pass capacitors. Move the PROBE to (13) and here the gain of the triode amplifier is measured. Next, move to (14), which checks the coupling capacitor and bias of the output tube. Next, move to (15), which checks the gain of the output tube. From here move to (16) which is the voice coil of the speaker. Of course, the gain of the audio circuit must be reduced with the AUDIO LEVEL control as progressive tests are made through the receiver amplifiers.

TO CHECK INTERMITTENTS: Two amplifiers are provided so that the R.F. and Audio sections of a receiver may be checked. The first step in testing for intermittent is to localize the trouble in either the R-F or Audio section.

Feed a signal from a test oscillator into the antenna of a receiver and tune in a signal, say 600 kc. Set the PROBE SELECTOR in the 'R.F. IN' position and the METER SELECTOR to 'R.F.'. Using the meter as a signal indicator, attach probe to plate of diode detector and after setting the RANGE SELECTOR, tune in the signal. This will serve as a monitoring device for all circuits

ahead of the second detector. Now turn A.F. AMPLIFIER switch to 'OFF' position. Plug auxiliary cable into A.F. INPUT jack and attach to plate of audio output tube. The SPEAKER switch must be 'ON', for the signal monitoring device is the SPEAKER. Let this set-up remain until the intermittent occurs. If the signal fades at the diode plate and the plate of the output tube, the trouble is ahead of the diode plate. If the signal is constant at the diode plate, then the trouble is in the audio circuit. If both signals fade or cut out, move the probe marked PROBE to the mixer plate. Now set the AUDOLYZER so that the speaker will monitor the R-F signal; that is, A.F. AMPLIFIER 'ON' and SPEAKER 'ON'. Here three signals are present - R-F, I-F and oscillator. In case an intermittent occurs, it is only necessary to change the band selector and hunt for each signal to see which has faded or cut out. When the probe is at the mixer plate, the external voltmeter can be used to check the power supply by turning the METER SELECTOR to 'EXT.' and using the pin jacks marked METER + and METER -. Of course, the meter should be set first at '0' and proper range selected. From this it is easy to see that with the intermittent occurring twice, the trouble can be localized and then the faulty part located.

TO CHECK DISTORTION: The quality of the note heard in the speaker will indicate distortion. As progressive steps are taken in testing a circuit, a difference in the tone of the note will indicate distortion. Connections are provided for a more accurate check by use of an oscilloscope. Plug auxiliary cable into jack marked 'SCOPE' and note this signal as fed into the oscilloscope.

ALIGNMENT OF RECEIVER WITH THE AUDOLYZER: Formerly, receivers have been aligned with the A.V.C. voltage made inoperative in order that tuned circuits could be peaked to their full sensitivity. Inasmuch as the A.V.C. voltage changes the input capacity of R-F and I-F amplifiers by varying their biases, the

Audolyzer offers an excellent opportunity to do a better aligning job by tuning all circuits to their average operating conditions.

First, this A.V.C. voltage must be determined. Therefore, if the set is badly out of alignment, use the Audolyzer as an output meter (PROBE SELECTOR set at 'A.F. IN' and METER SELECTOR set at 'A.F.') and with the local oscillator of the receiver dead, align the I-F, using a test oscillator as a source of signal fed into the receiver's mixer grid. Then connect the test oscillator lead to the receiver's antenna, make the receiver oscillator operative, and align the oscillator, R-F and detector sections.

Then tune in one or two of your favorite local stations. With these signals passing through the receiver, use the electronic voltmeter in the Audolyzer and measure the actual A.V.C. voltage developed.

This A.V.C. voltage has changed the frequency of the I-F and R-F amplifiers slightly. Accordingly, use a test oscillator and a strong enough audio modulated signal into the receiver to develop the same A.V.C. voltage as the local station. Now realign the I-F amplifiers for maximum gain. If the best possible quality is to be obtained from the receiver, the band pass of the I-F transformers should be checked with a frequency modulated signal generator. For further information, we refer you to 'Receiver Alignment Procedures' one of a series of booklets written especially for the radio serviceman in a language he can understand. These booklets are available from the factory for twenty-five cents (25¢) each.

If the receiver has an A.F.C. system, this should be made operative and aligned immediately after the I-F transformer alignment. See Fig. 3.

With the test oscillator set at the I-F frequency, place voltmeter probe on the plate of the discriminator. Adjust the primary of the discrim-

inator transformer for maximum signal. Then place the voltmeter on the end of the bleeder circuit or control tube grid supply bus and adjust secondary for '0' voltage indication on the voltmeter.

Finally, realign the R-F, detector and oscillator sections of the receiver slightly using the Audolyzer as an output meter. This should be done at the frequencies specified by the receiver manufacturer.

USE OF OHMMETER: To place the instrument in operation as an ohmmeter, the following procedure should be followed closely.

The METER SELECTOR should be set to 'OHMS' and regular test leads should be inserted in the plus (+) and minus (-) pin jacks marked METER. Connect the tips of the test leads together and adjust the meter to full scale or zero ohms by means of the ZERO ADJUST located on the upper extreme right hand side of the panel. The meter should be adjusted 'ZERO OHMS' for each position of the METER RANGE control.

The multiplying factors for the ohmmeter ranges are listed below. In order to obtain the resistance reading, observe the position of the METER RANGE switch and multiply the reading by the number in the right hand column of the following table. For example: Suppose that the meter reads '4' on the 2 meg. range. Multiply '4' by 1000 or simply add three zeros which means the resistance is 4000.ohms.

METER RANGE	MULTIPLY READING BY
200	0.1
2,000	Read direct.
20,000	10
2 meg.	1,000
20 meg.	10,000

On the 200 ohm range of the ohmmeter, low resistance test leads should be used for better accuracy. Corroded or rusty test probes may introduce sufficient resistance toproduce a false read-

ing when measuring resistances which are normally about 2 or 3 ohms, such as voice coils and R-F coils.

The 200, 2,000, and 20,000 ranges are powered by an internal battery of 1 1/2 volts (D-C) thus making it unnecessary to have the power turned on when using as a low range ohmmeter. The 2 and 20 megohm ranges reauire approximately 25 and 250 volts respectively which is obtained from the power supply of the Audolyzer. These ranges are especially valuable in checking low voltage capacitors for leakage.

CAUTION! The shielded connector extending from the rear of the Audolyzer should be removed from the chassis of the receiver under test when using the ohmmeter function. If this is not done, false readings may result in making resistance measurements. The pin jack marked 'GND' is not at chassis potential when the METER SELECTOR is in 'OHMS' position. In other words, do not use a connector from the minus (-) or GND pin jack, as a ground return when the METER SELECTOR is in 'OHMS' position.

AVERAGE GAIN PER STAGE VALUE

Antenna transformers	3 to 7
Antenna transformers (auto sets)	10 to 45
R. F. amplifiers	12 to 35
Converter tubes	20 to 40
I. F. amplifiers (single stage)	50 to 150
I. F. amplifiers (two stage)	10 to 20
Loss in diode detectors	1.25 to 1 to 3.1

TUBE TYPE	GAIN VALUES
75 (triode section)	40 - 50
6Q7 (triode section)	30 - 40
6F5	40 - 50
6C8 (etc.)	20 - 25

SERVICE AND MAINTENANCE

Replacement of the tube in the voltmeter, type 6J5, may require a small adjustment of the variable resistor attached to one meter lug. With the ZERO ADJUST CONTROL, set the meter to '0' center scale. Apply one volt D-C to the positive 1-volt range and adjust the variable resistor until the meter reads 1 volt. Then check the negative 1-volt range. If this reads out of tolerance, reset the variable resistor and the ZERO ADJUST CONTROL, until both scales track.

All functions and ranges of the SUPREME Model 562 were carefully tested and calibrated before shipment from the factory. Under normal operating conditions this instrument should give a long and trouble-free service. However, if for any reason this instrument should fail to operate properly, write the Service Engineer at the factory. Submit complete information regarding the difficulty and full instructions will be forwarded in detail. The Model and Serial numbers, position of controls, inoperative section, and any other information should be given in your *first* letter.

REPLACEMENT PARTS

The parts used in the SUPREME Model 562 were carefully inspected for mechanical and electrical defects at the factory. Under normal conditions and average use the life of the tubes will be equal to those in radio receivers (approximately 1500 hours). Any special parts which are not available from regular dealer stocks may be ordered from your nearest SUPREME distributor by describing the item and giving the Model and Serial numbers of your unit.

SUPREME INSTRUMENTS CORPORATION
GREENWOOD, MISSISSIPPI
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Vintage Schematics, and Publications

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